ARCHITECTURE

VOL. XVII. MARCH 15, 1908. No. 3

ARCHITECTURE, conducted by a Board of Architects in the interests of the profession, is published the fifteenth of every month by FORBES & COMPANY, LTD., (A. H. Forbes, Prest.) 225 Fifth Avenue, New York. Its opinions on technical subjects are either prepared or revised by specialists.

PRICE, mailed flat to any address in the United States, Mexico or Cuba, $5.00 per annum, in advance; to Canada, $6.00 per annum; to any foreign address, $7.00 per annum.

ADVERTISING RATES upon request. The writing and displaying of advertisements is an art in itself, and the publishers will be pleased to give the Advertiser the benefit of an Expert's experience in this line at no additional expense.

THE PUBLISHERS regret that owing to the demand the supply of back copies of ARCHITECTURE is limited. Prices will be quoted on application The regular price of each number is 50c.

ENTERED at the New York Post Office as second-class mail matter.

PLATES AND ILLUSTRATIONS.

UNIVERSITY SCHOLARSHIPS OF THE ARCHITECTURAL LEAGUE OF AMERICA FOR 1908-1909.

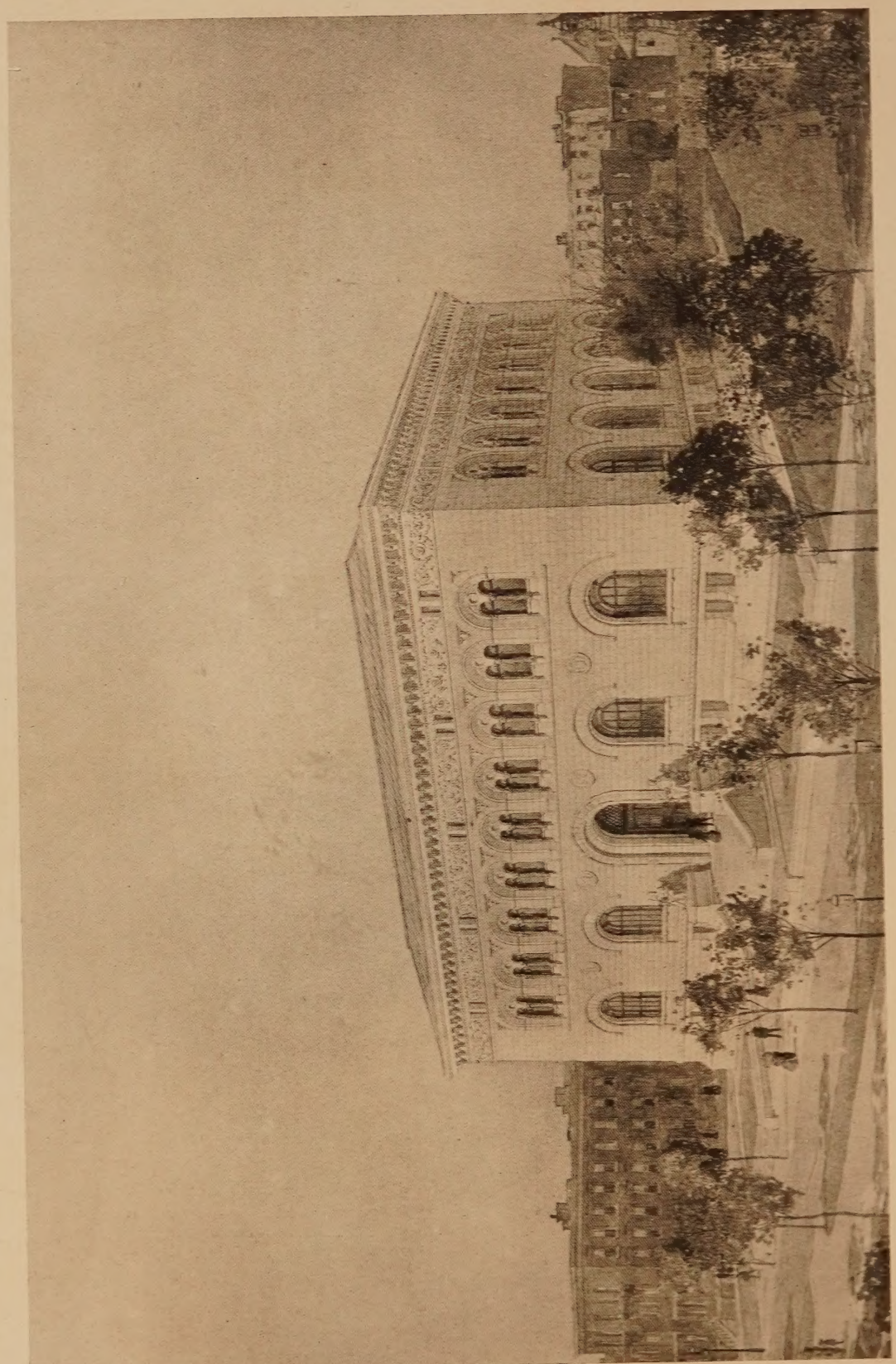
HARVARD University offers to members of the Architectural League of America three scholarships in Architecture. These scholarships are divided into two classes —Class A. One scholarship which is restricted to those who can pass the entrance examinations of Harvard College. Class B. Two scholarships for special students for which there is no examination, but a competition in architectural design to select the holders.

Class A. This scholarship to regular students is for one year, with the possibility of re-appointment for a second year, conditioned upon the record of the student made at the University. In order to pass the examination candidates should be graduates of a good high school or have an equivalent preparation. In June Harvard University holds examinations for admission in the principal cities of this country. The entrance examinations for this year are held from June 22 to June 27 inclusive. These regular entrance examinations will be taken by Class A candidates and the scholarships will be awarded to the student who passes with the highest standing. For a list of the subjects of the examination, the places of same for this year, and for other information regarding admission to Harvard College write for pamphlet to Mr. J. G. Hart, Secretary, Cambridge, Mass. This officer will, upon request, also send copies of recent examination papers. Each Club Secretary will also have a copy of the above pamphlet regarding admission. Applications for such examinations should be sent to that officer of Harvard University by April 1, and by this date the Chairman of the Department of Architecture, Harvard University, should receive applications for the scholarship, such application being approved by the Secretary of the Architectural Club of which the applicants are members, and applications from individual members being approved by the permanent secretary. Candidates for the above scholarship would do well to review carefully those subjects in which they are to be examined.

Class B. Two scholarships for special students, each for one year, will be awarded upon the result of a competition in architectural design, on a program prepared by the Architectural Department of Harvard University. The competition in the various cities will be conducted by the League through the organizations affiliated with it, and will be judged by the Professor of Architecture of Harvard University and a Boston architect selected by the League. Provision will be made for individual members of the League.

Candidates for the above should notify the Chairman of the Committee on University Scholarships by April 1 of their intention to take part in the competition. This competition will be opened by a preliminary sketch to be made

(Continued page 39)



PERSPECTIVE, MARYLAND INSTITUTE, BALTIMORE.

Medal of Honor, N. Y. Chapter, A. I. A.

Pell & Corbett, Architects.

Architects of To-day.

MR. F. LIVINGSTON PELL, NEW YORK.

(Continued from page 37)

on Saturday, May 2. One week will be allowed for making the final drawings. Directions regarding the conditions under which these drawings are to be made, their size and the manner of sending them will be issued later. These scholarships entitle their holders to free tuition in Harvard University during the periods stated above, the cost of such tuition otherwise being $150.00 per year.

It is hoped that a large number of men will avail themselves of the splendid opportunity presented by the above. Further information may be had from the Chairman, Mr. Emil Lorch, Ann Arbor, Mich.

The Architectural League of America also has a foreign or traveling scholarship, for information regarding which apply to Professor Percy Ash, Chairman, Committee on Traveling Scholarship, George Washington University, Washington, D. C.

COMPETITION FOR LOW-COST HOUSES, NOT TO COST OVER THREE THOUSAND DOLLARS.

IT is proposed to erect at East Walpole, Massachusetts, in connection with the F. W. Bird & Son's paper mills, a group of low cost cottages, similar in construction to experiments which they have already made with their products as an exterior covering, and a competition is presented for the purpose of selecting new and varied designs.

This competition will be conducted under the rules of the American Institute of Architects, with prizes for the first eight.

Professor Francis W. Chandler, head of the Architectural Department of the Institute of Technology, and Mr. Charles Collens, of the firm of Allen & Collens of Boston, have consented to act as judges.

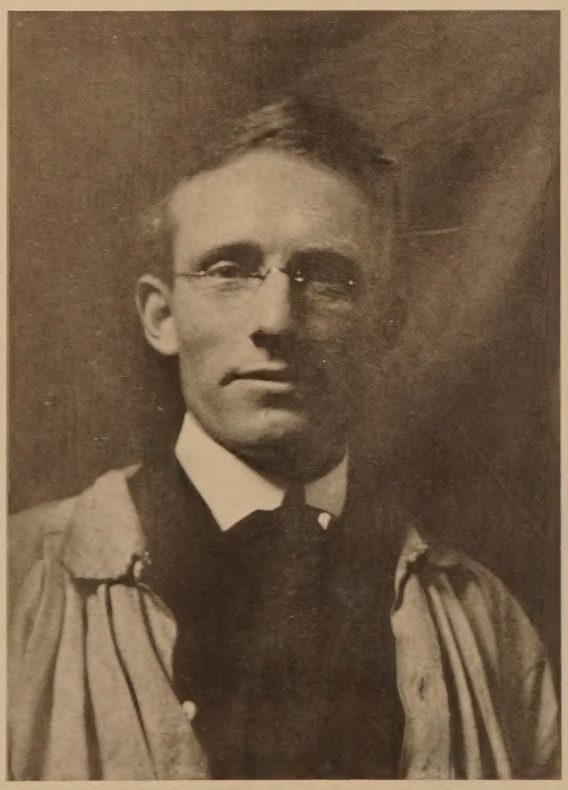
OFFICE ECONOMIES.

R. H. HEATHCOTE.

INCREASING rents, combined with a period of depression in the building trade, has made it necessary of late for architects to seriously consider whether economies can be effected in the running of their offices.

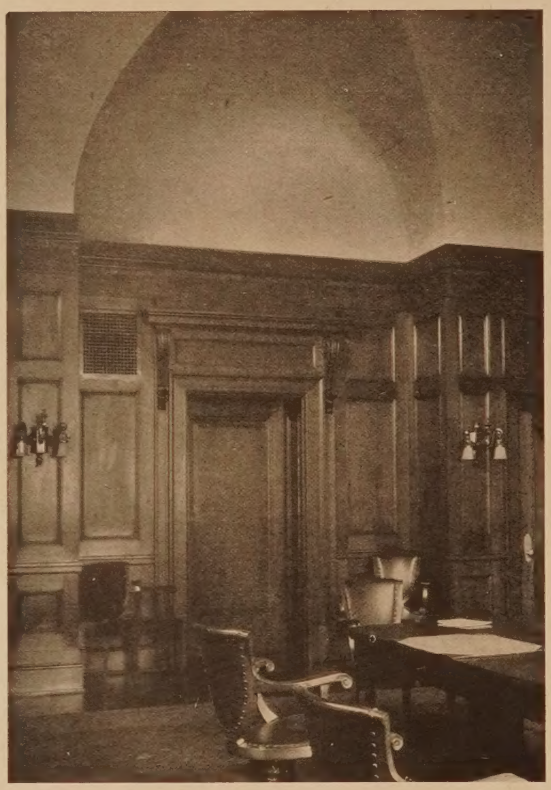
The first economy thought of is invariably that of reduction in staff—that is, if there be a staff to reduce—and it is wonderful with how few assistants an architectural practice can be carried on . A principal may argue that, in order to occupy few rooms and pay a small rental, it will be more profitable to employ two good assistants than three indifferent ones, even if he pays the two as much as he would have done the three—for thereby space is saved, and space means rent. It is often, indeed, practicable to carry on a moderately extensive practice with no more help than that which can be afforded by a good tracing clerk, if the principal is content to do a good deal of the pencil drawing himself, and to put out his quantities, and with them the writing of his specifications, as is now frequently done. At one time it was the custom—an excellent custom—to prepare all the working drawings as highly finished sheets upon good drawing-paper. This can still be done with economy where rents are low, and where assistants are not highly paid; but in cities where there are plenty of opportunities

(Continued page 43)

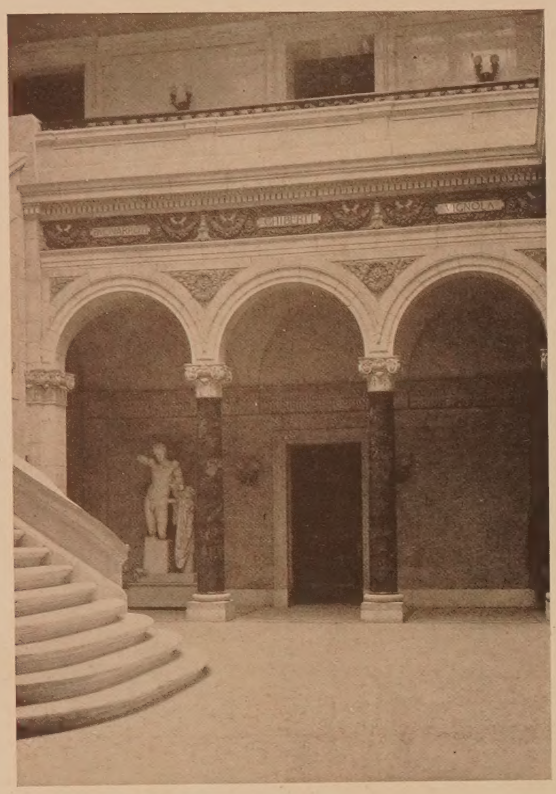


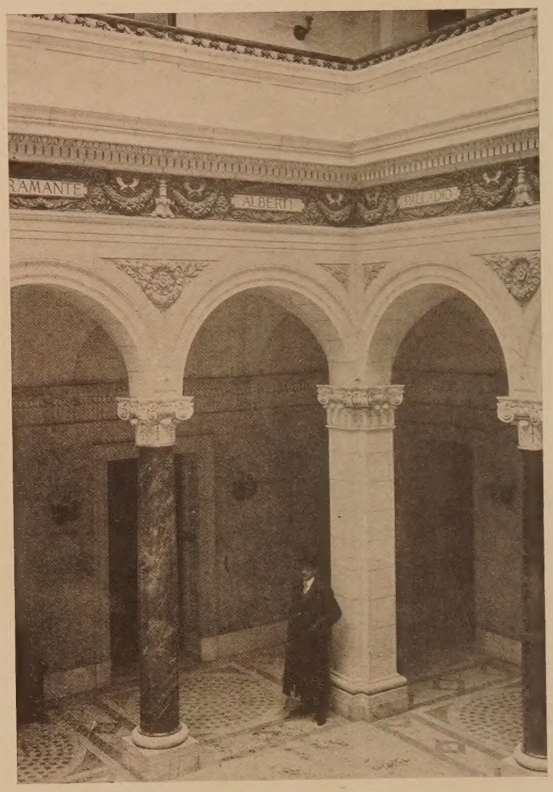
Architects of To-day.

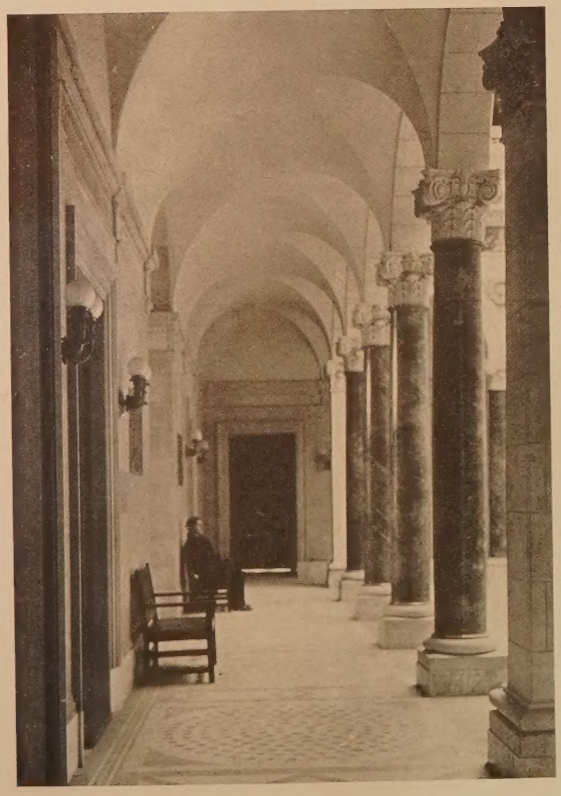
MR. HARVEY WILEY CORBETT, NEW YORK.

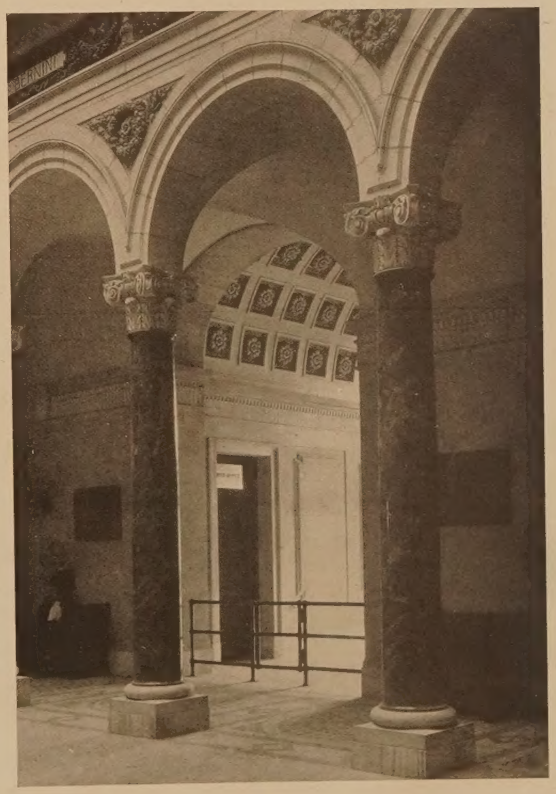


INTERIORS, MARYLAND INSTITUTE, BALTIMORE. (See Plates XXII-XXV) Pell & Corbett, Architects.



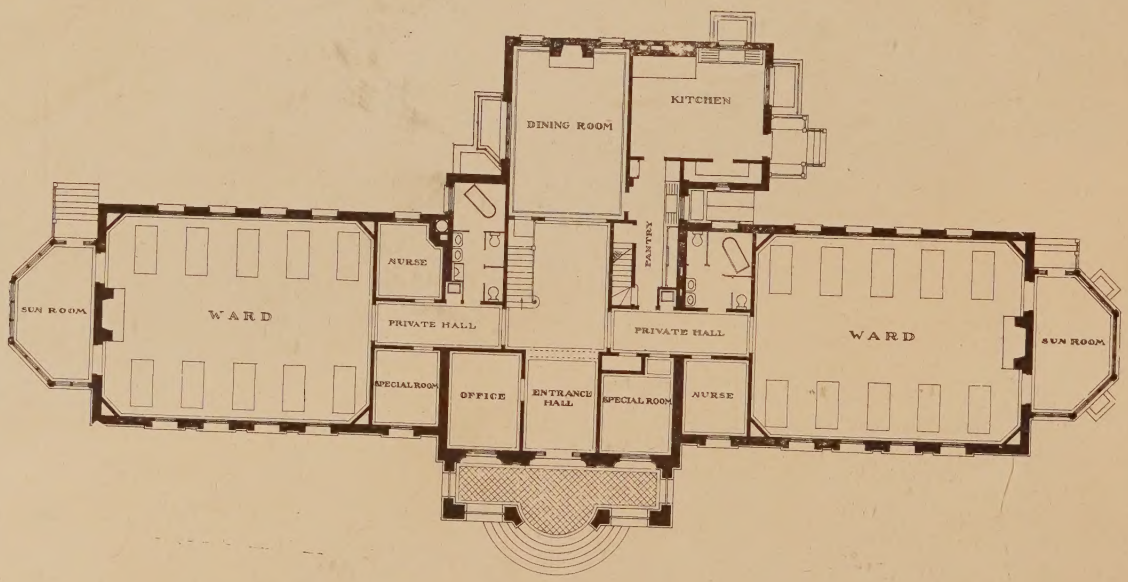






INTERIORS, MARYLAND INSTITUTE, BALTIMORE. (See Plates XXII-XXV)

Pell & Corbett, Architects.



PARKER MEMORIAL HOSPITAL, NEW BRUNSWICK, N. J

Cady & See, Architects.

(Continued from page 39)

of having reproductions made at a cheap rate from inked-in tracings, it is now almost universal for these to be employed. The architect will himself make his pencil sketches upon tracing-paper, using a separate flap for the plan of each floor. When he has worked these up to his satisfaction, and has made them perfectly distinct, he can hand them over to his assistant to arrange and trace in ink upon tracing-paper. These ink tracings are sent to the photographic reproducer, and as many copies as are required are obtained from him at short notice, in blue or brown, or even black line, upon good drawing-paper or tracing-cloth; or, if only rough reproductions are required, then with more economy in white line upon blue paper. According to the process chosen, it is possible or not to color such reproductions, this being only practical with the more expensive processes; but the small extra cost is worth incurring, and the finished production differs but little to an unobservant eye from the hand-prepared working drawing of a previous generation, while it is claimed as a distinct advantage that all copies are exact replicas—in form, at any rate—of one another, the liability to error induced by having each made by a different and possibly careless assistant being non-existent.

This, the primary economy of a modern architect's office, has had a good deal to do with the difficulty now experienced by assistants in obtaining employment, for it is obvious that, if every practitioner has been enabled to reduce his staff by one or two, the openings for employment must be many less than used to be the case.

All other possible economies are comparatively insignificant. To save office space is the most important. Old drawings must be carefully packed away in well-arranged drawers or pigeon-holes, properly endorsed and easily found when wanted, but occupying very little space; while letters and similar litter should be carefully kept under control, and such as have any business value should be endorsed and put away at frequent intervals. For purposes of storage it is generally possible to arrange a series of hanging cupboards above the headline of the room, and along most of the walls, it being the space in front of the windows which is mostly needed for the drawing tables. Many architects like to possess a library; but where space is a matter of importance it is better that the books should be kept at the comparatively low-rented home than at the expensive office, and brought up when needed, except, perhaps, a few which are in constant request.

Of course, specifications, even if prepared in the office, are never now written out elaborately by hand, a single copy at a time, as was done almost universally a generation since. The typewriter has changed this. In small offices such work is sent out, but in larger ones a girl clerk is employed, who also takes down and transcribes letters; but her more important work is that of copying specifications, using carbons with which to obtain as many as three or four impressions at a time. If the office is one in which more copies than this are likely to be required, one of the many forms of duplicators now upon the market is generally to be found in it, and by its means hundreds of copies, if necessary, can be obtained without the expense of setting up type and printing.

Some men think a great deal of the minor economies which can be effected by the use of cheap paper and ink, but the more generously-minded man recognizes that these are extravagances rather than otherwise. The tracing-paper upon which sketches are made must always be sufficiently stout to enable the rubber to be used upon it, while being sufficiently transparent to show a pencil line. It must consequently be a good paper. That employed for the ink work which has to be reproduced must also be transparent, and if not necessarily so thick as that required for pencil sketching, should at least not be liable to tear. In the matter of pencils there is not much to choose in cost, and the item is at any rate a small one.

If an architect has any practice worth talking about, the telephone is absolutely essential to him—not as an extravagance, but in order to save him a good deal of personal time, or the sending of assistants long distances upon urgent messages. The economy effected is again one of staff, and has to be set against the actual rental paid to the Telephone Company. What this extreme staff reduction is eventually to lead to it is somewhat difficult to say; but the condition of affairs has altered largely in this respect from what it was a few decades ago, and the matter is one which is urgently calling for consideration, as it particularly affects the younger men who are now being trained in considerable numbers. When they wish to obtain experience of a practical nature, they will undoubtedly have difficulty in obtaining an entry into the office of architects of moderate practice, and will be forced to start practice for themselves before they are fully competent to do so.

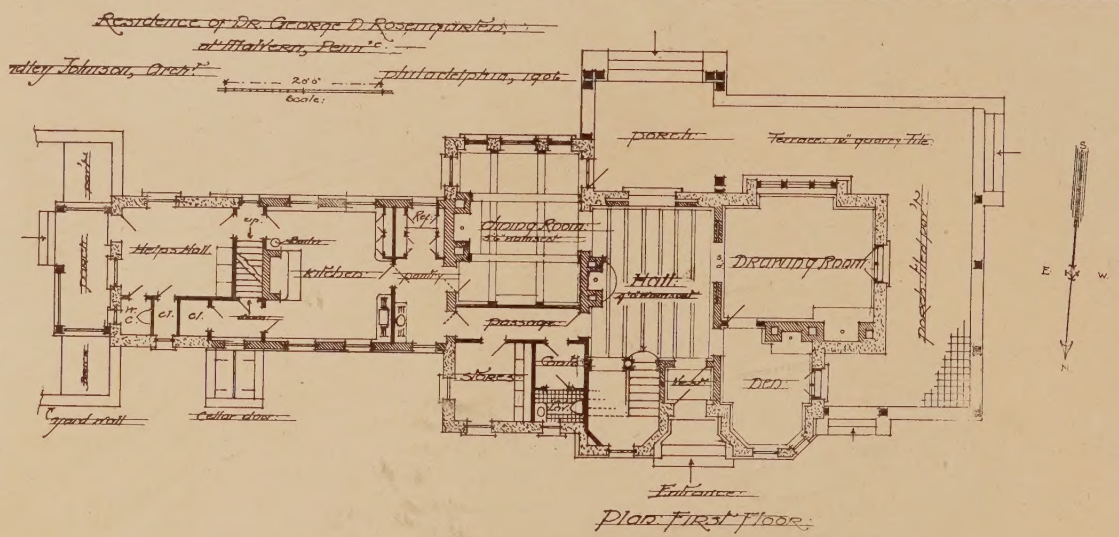
WHAT IS ARCHITECTURE?

C. J. WARREN.

MANY a definition of architecture has been attempted from time to time, and although that which describes it as the art of building beautifully is, perhaps, as correct as any, yet it is really impossible to express in a concise phrase all that architecture really implies. There are several ways in which it differs from the other arts. Works of painting or of sculpture are produced by the artist himself, even though a certain amount of rough-hewing be done for him by his assistants; but a building is a production of many men who, while controlled by a single master, known as the architect, have each his own distinct individuality, with the result that the finest architectural work is not the product of one, but of many artists, each of whom has contributed his share towards the completion of the whole. In this way it is more analogous to music, which, originated by a composer, has frequently to be rendered by a whole orchestra of trained musicians, each capable of appreciating the master's scheme, and of making his own particular part in it as perfect as possible—harmonious with the rest, yet distinctive in execution. This is more evident the higher is the character of the work produced, oratorio and opera requiring the assistance of many more artists—and those greater ones—than the rendering of a pianoforte solo. The analogy between music and architecture is here close, for it is only in the finer buildings that the greatest craftsmen are employed—sculptors, carvers, and ironworkers—each an artist in his own department, to whom as much latitude must be permitted as to a prima-donna who takes the leading part in "Faust" or "Carmen."

But if architecture is nearly allied to music in this respect, it is far different from it in the matter of permanence. Music is entirely ephemeral; for though a piece may be

(Continued page 45)



COUNTRY HOUSE, DR. GEORGE D. ROSENGARTEN, MALVERN, PA. Lindley Johnson, Architect.

(Continued from page 43)

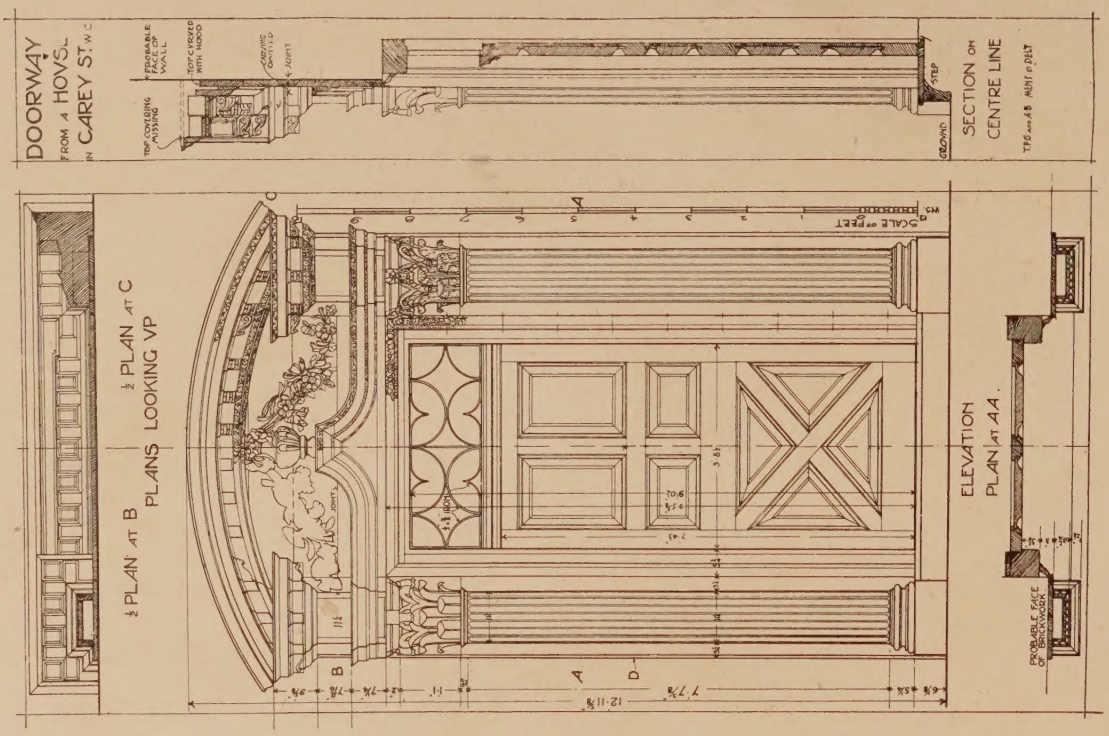
rendered again and again, it is never produced alike by two performers. It is constantly varying, and has to be repeated afresh every time that it is heard, while in the course of time even the finest music falls into disuse and disappears from knowledge. Architecture as an art is far more permanent, and each work retains throughout its whole existence precisely the same touches as it did on the first day of its completion, except for the softening effect of time and weather, and for deliberate alterations made by man. But again, like music, it is only the greater and stronger works which last, with here and there some beautiful little gems. Yet, though the period of existence is much greater, eventually the building, like the song, will fall into disuse. Again, like music, architecture is to a great extent a cosmopolitan art; but at the same time it is distinct with racial feeling. All nationalities can equally appreciate one of Handel's oratorios or a great Renaissance palace; but Handel's work could only have been produced at the time he lived and under his conditions, just as any particular palace could only have been built in the country where it is to be found, and at the date of its erection. But architecture goes much further than does music in this direction, for one building will often tell a tale of centuries, bearing its history indelibly printed upon it for all who care to read. Take any typical English cathedral. It will almost surely begin by proclaiming the stern martial character of the Norman conquerors—great warriors and and equally great churchmen, who built as they fought and lived—hard, fierce, and overbearing. But, while there will be evidence of Norman masterfulness, it is equally almost certain that there will be signs of the building having been enlarged many times subsequently to the Norman period, and altered as the spirit of the country changed. The beautiful Lancet work of the Early English period, with its upward tendency and its delicacy of moulding and of carving, particularly shown in the spring-like foliage, replaces the more solemn Norman work, and is indicative of a lighter and freer spirit, as the English race emerges from its subjection to the foreign over-lords, and as the religious spirit of the time becomes brighter and more spiritualized, less forbidding, and perhaps more noble. Again, as time goes on, the same great church will show the gradual introduction of more luxury into the lives of the people, and particularly of the priesthood—a greater love of comfort, and less spirituality——till, when the time came for the Reformation, the need for change was strongly indicated in the degradation of architectural forms.

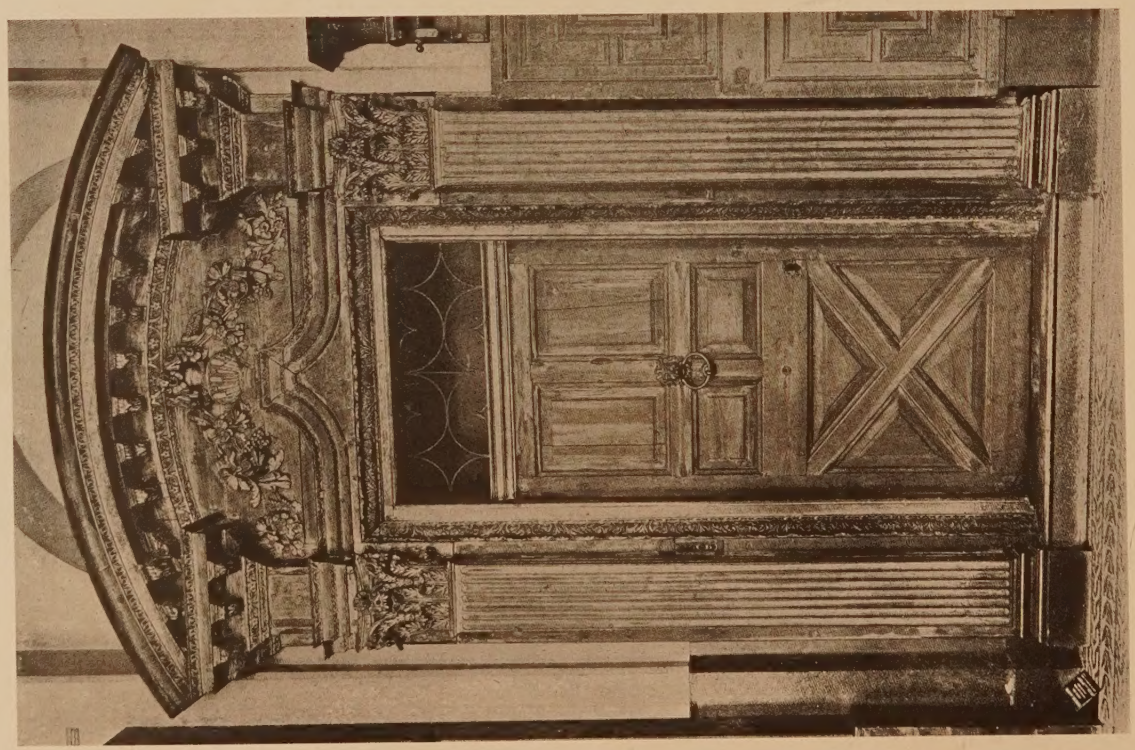
Thus we arrive at last at the real essence of the matter. Architecture more than any other art gives to those who are capable of reading it aright an insight into the habits and customs, and even into the innermost feelings, of the people of its time. Unconsciously—sometimes, as it were, in spite of itself—it announces the characters of those under whose inspiration great buildings have been erected, and, all the more forcibly in consequence of the absence of effort, it proclaims a mean race to be mean and a noble one to be noble. It indubitably declares the pure intellectuality of the Greek, the vulgar coarseness of the Roman, the high spirituality of the mediæval monk and nun, the fierce warrior spirit of the Border noble, and the voluptuous vulgarity of the Italian in his pride. And the buildings which display these qualities not only indicate their possession by those who built them, but inculcate the same to other races and through countless ages. Receptive themselves, they react by teaching the human race; and it is indeed well for humanity that only the best survives, so that on the whole the teaching of great architectural works is for good, and not for evil—for nobility, and not for meanness.

To the architect there belong great responsibilities. It is his duty to declare, in the works which he produces, the spirit of his age; in fact, he cannot help himself in this respect, strive how he may; but at the same time he has to teach something to people yet unborn, and here at least his individuality may to a great extent control his product. The more intellectual, the more spiritual, he is himself, the higher will be his teaching; and although a town hall which he builds may be as distinctly municipal as possible, yet it may combine with its declaration of civic respectability a certain refinement which is due to the artist's self, and so bear down to future ages a lesson of simple dignity and high desires, as well as indicate a time of municipal growth.

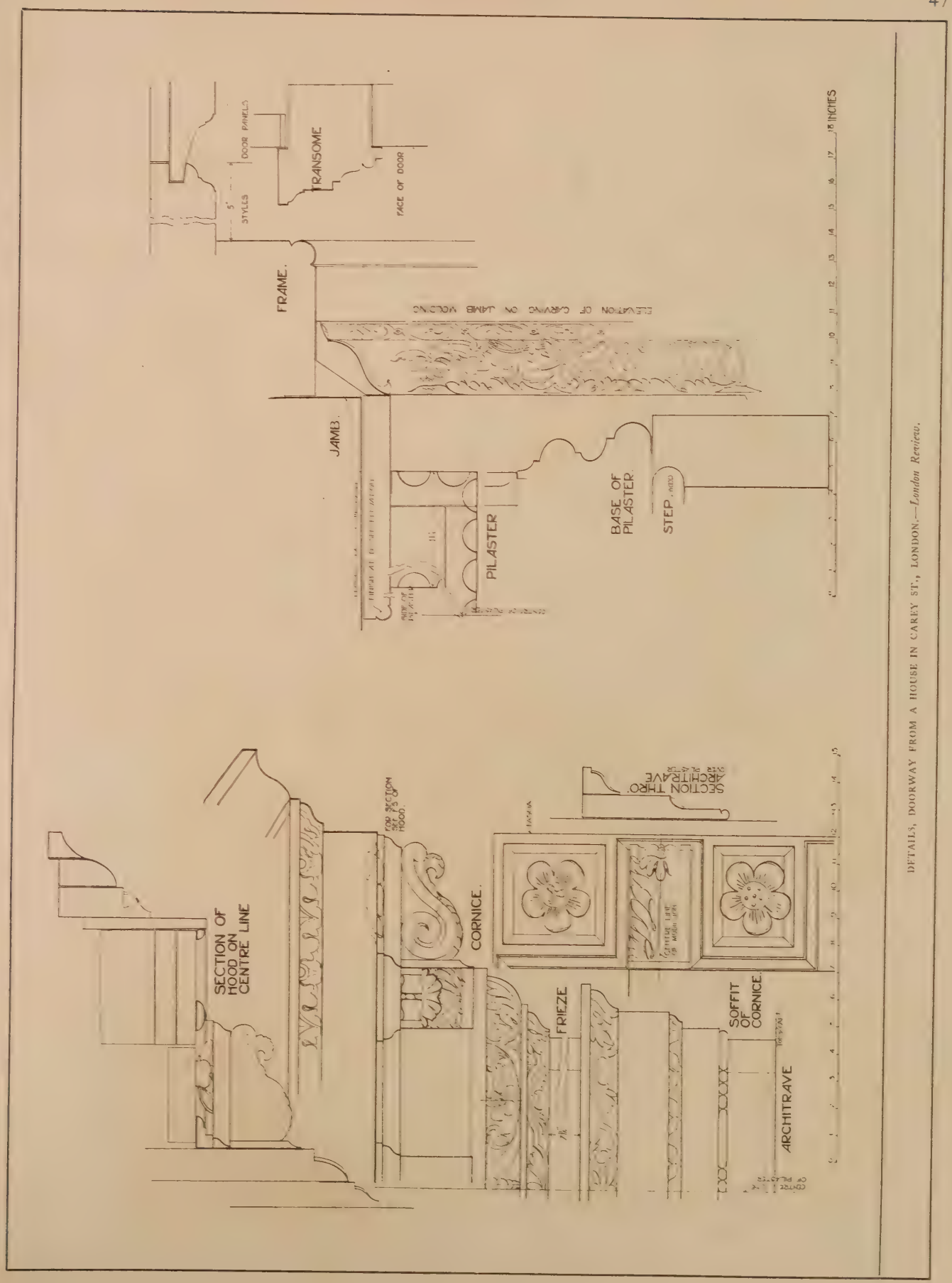
Perhaps the most universal question which architects of the present day are teaching to the people of future generations is that of the purity and beauty of modern home life. Unquestionably much of this at present is still sordid enough, as indicated in our mean streets, and even in our rows of suburban villas; but these, after all, are only temporary structures, which must disappear in the course of a little time, to make room for other things, just as the conditions of life which have given rise to them will change. The well-built, well-designed country house, however, is entirely a different thing, and much more indicative of family life, displaying in perfection the standard which even the resident in a small suburban flat endeavors to copy so far as his means will permit. Here, at least, building as a rule is honest, and design is tasteful, while each house, different as it is from all others, whether planned by the same or by a different architect, tells equally well to those who are to come what is the present high ideal of family life and comfort in this country. If the general tendency of the day were vulgar these tasteful edifices would be impossible; yet even they can be marred by an architect who is not in sympathy with the spirit of the age, or they may be improved and carry with them higher and higher lessons as the architect himself is the more cultured and refined, and himself home-loving. His responsibility is great, undoubtedly! And, if this be the case with regard to domestic work, it is all the more so in respect to greater buildings seen by a more numerous public, and influencing the lives the more. A great street frontage or a theatre may teach many a lesson of nobility of purpose or of degradation of soul, according as it is treated; and it is surely a good sign of the times that, taken on the whole, these things are of more noble character than they were a little while ago, even if they have not yet reached the beauty and the individuality of the work of ages past. In ecclesiastical work particularly the spirit of the time is always evident, and here the architect's responsibility is even greater than elsewhere. The tendency of various yet recent times to build churches which were imitations of those of days gone by—gallery churches or home-like churches—have all successively passed away. The present idea is to erect a modern church —and by "modern church" is generally meant one in which the planning is made subservient to the needs of the ritual, and the design beautiful and naturally responsive to such planning, not overridden entirely by precedent. The spirit

(Continued page 49)





DOORWAY FROM A HOUSE IN CAREY ST., LONDON, AND DETAIL.—*London Review.*



DETAILS, DOORWAY FROM A HOUSE IN CAREY ST., LONDON.—*London Review.*

THE SCRANTON CLUB, SCRANTON, PA.

Edward Langley, Architect.

(Continued from page 45)

seems to be the right one, and in obeying the spirit, as the architect is bound to do, he only does as others have done before, and tells to future churchmen how the spirit of the age has influenced the religious thought and feeling of his day. But the degree of spirituality in the work will depend upon himself—upon his honesty of purpose and his possession of certain higher gifts which are not always thought to be a necessary part of the architectural student's training, though they are essential to the production of work of the very highest order.

HEATING AND VENTILATING.

THE practice of combining heating and ventilating processes into a joint system is based upon that principle of physics which demonstrates the difference in gravity between cold (or foul) air and that of heated air; the former being the heavier tends to fall, while the latter from its lightness tends to rise, these differences in density serving to create currents of opposite direction, whereby the ascending current of heated air displaces the cold or foul air, which then falls to the level of the floor of any enclosed space, where from its density it would remain stratified, unless displaced by agitation or by liberation through vents at its level, says F. M. Griswold in *Insurance-Engineering*.

Hence in all scientifically planned combined heating and ventilating systems, where natural forces are utilized as means of operation, the vent ducts for the escape or removal of cold or foul air are located at the floor level of an enclosure, and, when properly installed, insure successful accomplishment of the purpose intended, even if in arrangement and construction such system may not always present conditions promising immunity from fire through the faults of design and installation.

Experience has fully demonstrated that the important feature of fire hazard has not generally influenced the design and introduction of such systems, this being particularly true in relation to the conditions found to exist in the average school-house and church structure, as well as in many public halls, court houses and the like, where it is not at all unusual to find wood ducts or conduits in use, not only for conveying the outer air to the base of the heating furnace, but also as flues for conveying the heated air to points of distribution, and for the removal of the cold and foul air from the heated enclosures; this practice in either of its phases is most reprehensible, and under intelligent supervision and regulation is never sanctioned, while in advanced communities such practice is in violation of the law and subjects the responsible violator to prosecution and penalty on conviction.

Under this method of heating and ventilation are to be found two distinct systems respectively known as the "direct" and the "indirect." Under the former the foul and dust laden air is carried from the floor of the rooms through ducts or flues by action of the heated air currents which displace the foul, and these flues deliver the foul air above the roof of the building, thus securing the direct ventilation which serves to indicate the method, and where such system is properly installed it presents the least hazard of these combination systems.

The "indirect" system seeks to secure the removal of all foul or cold air, not only from the area of the room enclosures, but also from all of the hollow spaces surrounding the same, including the spaces between the floor joists and the partition studding. To accomplish this end, the area of space between the floor joists is increased by nailing 2 x 4 wall strips across the joists, and openings are made through partition walls from the joist-channels to the spaces between the studs, thus providing a complete maze of communicating horizontal and vertical spaces, accessible to flame while inaccessible to means of extinction, the whole presenting a most cunningly devised means of insuring rapid combustion and destruction of the building in case of fire.

In some instances the above objectionable features of the "indirect" system are found to be materially aggravated by the presence and use of the so-called "dry-closet" system, in the operation of which excreta from the toilets is destroyed by burning with the aid of volatile or highly combustible material such as gasoline or kerosene oil for fuel, hence, where the "indirect" system is in use, with or without the "dry-closet" attachment, we prefer to decline the risk absolutely.

As it is entirely within the bounds of commercial practice to install these combination systems in a manner which will markedly minimize, if it may not entirely eliminate, the danger of fire now so evident in general practice, there is no good reason why such precautions should not be insisted upon in all cases, whether the installation be new or old, and we therefore submit the following suggestions as being based on good practice in relation to construction and installation of such systems:

HEATING FURNACES should in all cases be erected upon a solid foundation of brick or stone, with hearth of brick, stone or cement not less than 36 inches wide in front of the ash pit. The top or dome of the furnace, and also its smoke pipe, should not be less than 18 to 20 inches from unprotected woodwork or lath and plaster, and its side walls should be at least 12 inches from combustible material.

SMOKE STACK OR CHIMNEY should be built of sound, hard brick on a solid foundation, with double walls well bedded in cement mortar and having an air space between the walls, with all joints inside of flue carefully pointed; or may be single walled, not less than 8 inches thick, enclosing burned clay smoke flues, or if without such smoke flues, walls must not be less than 8 inches thick and all joints, both inside and outside, should be as carefully "pointed up" as would be called for in a pressed brick front. Stack should be carried 4 feet above the roof, and all timbers or woodwork exposed to stack should be framed around same, leaving an air space of not less than 2 inches on all exposing sides.

HOT AIR DUCTS should preferably be entirely of brick or hard burned terra cotta tile, properly insulated from contact with woodwork or other combustible material, but may be constructed of expanded metal and plaster or of bright charcoal tin; properly supported and insulated by air space of not less than 2½ inches from all exposed woodwork in either case, and, if constructed of tin, to be made double, with an air space of not less than ½ inch between the inner and outer flues when passing through or within wooden or lath and plaster partitions.

FOUL AIR DUCTS should be constructed in same manner as suggested for hot air ducts, but may be installed with not less than 1 inch clear space to woodwork. Ducts should not be connected directly with heating furnace nor any hot air or smoke flue, but preferably to a special flue

COUNTRY HOUSE, PELHAM MANOR, N. Y. Oswald C. Hering, Architect.

adjoining a brick smoke or hot air flue carried to the same height, but separated therefrom by not less than 4 inches of brickwork. (The radiated heat from the smoke flue will thus induce an upward current in the foul air duct adjoining.)

If foul air ducts be not connected to smoke or hot air flue as above suggested, they should each empty into a vertical flue of proper construction, which should extend above the roof of the building,, in which case the bottom of the flue could be left open and an upward current be induced by the heat from the furnace room, or by location of an open gas flame at base of flue.

Hot Air Registers, when placed in wooden floors or wainscoting should be set in soap-stone frames not less than 2 inches wide, well set and embedded in plaster of Paris. Register boxes, where passing through floors or wainscoting, should be made of bright charcoal tin, having joist or floor timbers framed around them to leave a space of from 2 to 2½ inches on all sides, according to the size of the box, the exposed woodwork to be covered with bright tin on all sides, extending from under the soapstone frame to and under the ceiling or open joist below.

At least one register of any system should be always kept wide open, either by the removal of the vanes or by securely wiring the valve to prevent its being closed.

Cold Air Ducts should preferably be entirely of brick, metal or other non-combustible material, but may, under approved conditions, be of wood up to a point not closer than 5 feet from inlet base at furnace, from which distance the construction should be entirely of brick, metal or other non-combustible material. The duct should extend to the outer side of the building wall and be provided with wire net or grating at that point.

As the average installation of heating and ventilating apparatus is seldom found to closely conform to the above suggestions for safety, there may be cases where the deviation from the lines laid down are of such minor character as to not seriously increase the fire hazard beyond that of the nature of their surroundings, and in such instances the judgment of the inspector should be exercised as to the proper course of action, always taking the benefit of a doubt on the side of caution where proper remedy cannot be promptly secured.

In the average district or village school-house the most frequent deviations from safe practice will usually be found to lie in the character of the material used in the construction and the arrangement of the foul air ducts or flues or the trunk flue conveying air to the firebox of the furnace or heater, and in illustration of such conditions we cite the following instances of dangerous practice as developed by recent inspections:

(1) Foul Air Flue (vertical) discharging under the roof in attic, thus providing means by which fire would very quickly reach the most inaccessible portion of the structure and gain headway before discovery. Such arrangement should serve to condemn the risk, whether the flue be non-combustible or of wood, as in either case the accumulation of dust and fluffy flyings would serve to feed a flame.

(2) Foul Air Duct, leading from outlets at floors above the heating device to the base of same at firebox. The method here noted is essentially dangerous, as falling embers from the furnace grate are liable to ignite the dust, paper or other refuse which accumulates in the duct, and thus convey fire to the building. Where such conditions exist they serve to condemn the risk, whether the foul air flue be of wood or of non-combustible material.

(3) Foul Air Flues (horizontal) passing under the ceiling from the floor outlets above the furnace room and opening into the smoke flue of the heater stack or chimney; arrangements of this character may well be classed as exceptionally hazardous, as the heated air of the smoke flue serves to carbonize the accumulation of dust, flyings and other refuse adhering to the inside of foul air duct, and will eventually ignite same, while a rising spark from a newly kindled fire in the furnace is almost sure to cause such ignition and carry flame to the interior of the structure; hence, the presence of such conditions will render the risk unacceptable.

(4) Foul Air Flues (horizontal) passing under the ceiling of heater room or cellar and emptying into open room. This practice presents an unnecessarily open-ended flue by which fire would rapidly pass into the structure and be difficult to extinguish, and while this condition is not so hazardous as the instances above cited, it is sufficiently objectionable to warrant severe criticism and demand for the use of non-combustible material in construction of the flue with a wire screen at its outlet. The method is unsanitary.

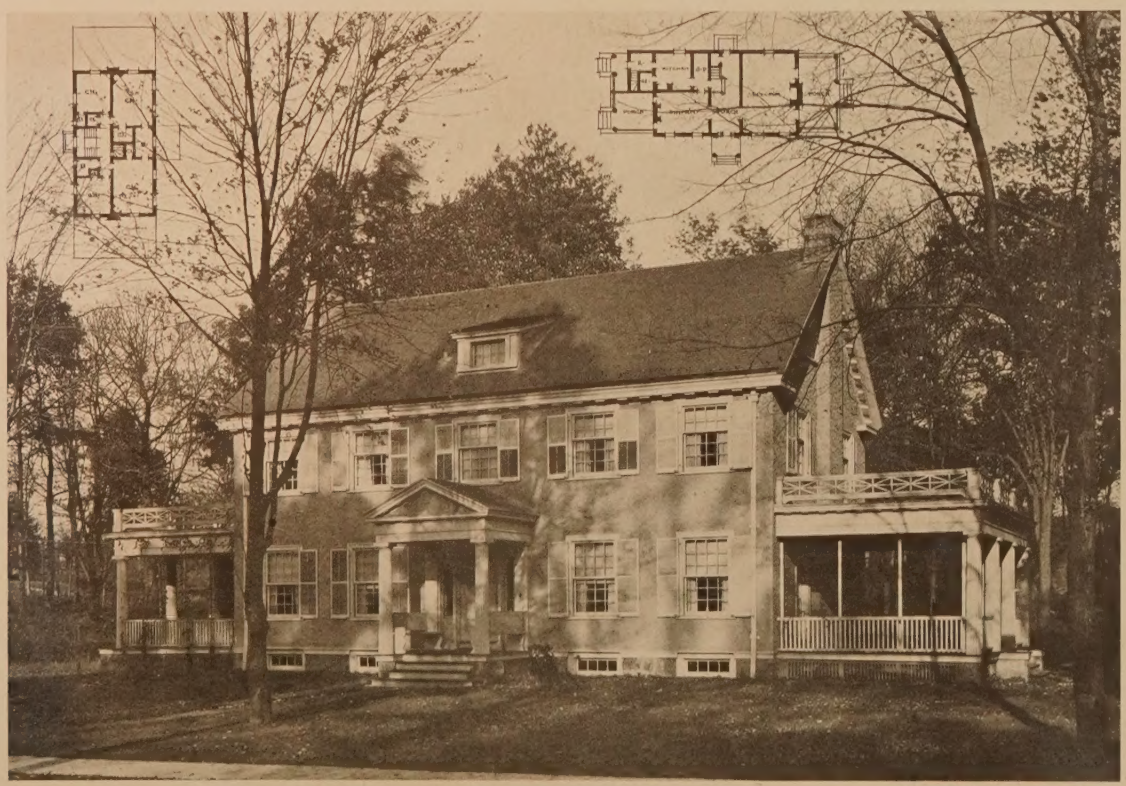
(5) Hot Air Flues, when constructed of wood, serve to condemn the risk entirely.

(6) Cold Air Duct, when entirely of wood up to entrance of furnace shell, presents a feature of hazard but slightly less objectionable than the deviation noted under citation No. 2 and for the same reasons, and demand should be made for substitution of non-combustible material for a distance of five feet from the furnace shell.

From the above citation it is apparent that much care must be exercised by the inspector in the examination and study of the deviations from good practice which will come before him.

THE NEGLECT OF WATERPROOFING.

WHY is so little attention being paid to the crying need for waterproofing in connection with building work? says the London *Architect*. Every possible precaution is taken against fire, while but scant consideration is given to that equally dangerous and far more insidious foe—water. Before the advent of steel framing and reinforced concrete the need for this protection could be neglected with more or less impunity; the use of steel, however, has introduced new problems, radically changing the whole situation and making the exclusion of moisture a matter of vital importance. Once let the integrity of the metal become affected by corrosion and there is no telling where the mischief will end or what disaster may follow. In view of this it would be but natural to assume that every precaution would be taken to give to structures the utmost waterproof degree, and that no reasonable expense would be allowed to stand in the way, especially as the steel must be hidden away where it cannot be subjected to periodical inspections. As a matter of fact less than a tenth of the



COUNTRY HOUSE, PELHAM MANOR, N. Y. Oswald C. Hering, Architect.

thought and care that is given to fireproofing is usually bestowed on waterproofing, and in many cases the need for the latter is utterly ignored. When some catastrophe results from this blind disregard of consequences the subject will receive the attention it deserves. But in the meantime buildings are going up in large numbers without this all-important protection. It will be too late to waterproof them properly after they are finished, for perfect work requires planning conjointly with the planning of the building. It also requires the carrying of the waterproofing completely under and around the foundations, thus enclosing and insulating them in a watertight box. Obviously this must be done, if at all, when the foundations are being laid.

Unfortunately there exists a widespread but utterly mistaken impression that concrete is in itself waterproof. This impression is much less general amongst engineers than amongst architects. It is hard to understand how it can exist at all, as but little investigation is needed to show how unfounded it is. Concrete which is always exposed to the air will never be waterproof. To understand this one has but to remember that hydraulic cements are mineral glues, which swell and harden under water, and thus fill the voids of the aggregate. So long as the concrete remains under water this condition continues. If, however, it is only part of the time under water and exposed to the air for the rest of the time, it becomes very difficult to keep it waterproof.

The absorptive power of ordinary concrete is from 2 per cent. to 25 per cent. of its weight of water. If by the use of proper materials and well-proportioned mixes we produce concrete having only two per cent. of absorptive power, practically no moisture would be apparent on the side exposed to the air if little or no pressure of water existed on the opposite side. In such a case a superficial observer would pronounce the material waterproof. If, however, any steelwork is embedded in the concrete it should always be borne in mind that the presence of even two per cent. of moisture is sufficient to set up corrosion of the metal. The elements entering into the making of concrete, such as the quality and proportion of the materials, the amount of water employed and the manner of mixing and placing the concrete, are all factors that vary so greatly that no two batches of concrete are ever exactly alike. It may be taken therefore as practically impossible to secure a mass of concrete having even nominally a waterproof quality. And even though we could turn out concrete which would be absolutely waterproof in itself, the fine hair-cracks which always appear as the concrete contracts would be sufficient to carry the moisture to the embedded steel. Is it not obvious, then, that an effectual system of waterproofing is a vital necessity for all such work? And if necessary where there is little or no water pressure to contend against, how much greater must be the necessity where foundations are carried below ground-water level.

The absorptive power of bricks is well understood, but even where these are used we still find that as a rule waterproofing is conspicuous by its absence. When it is employed it is usually something ill-adapted for the purpose and incapable of standing the test when it comes. The bricks

(Continued page xx)